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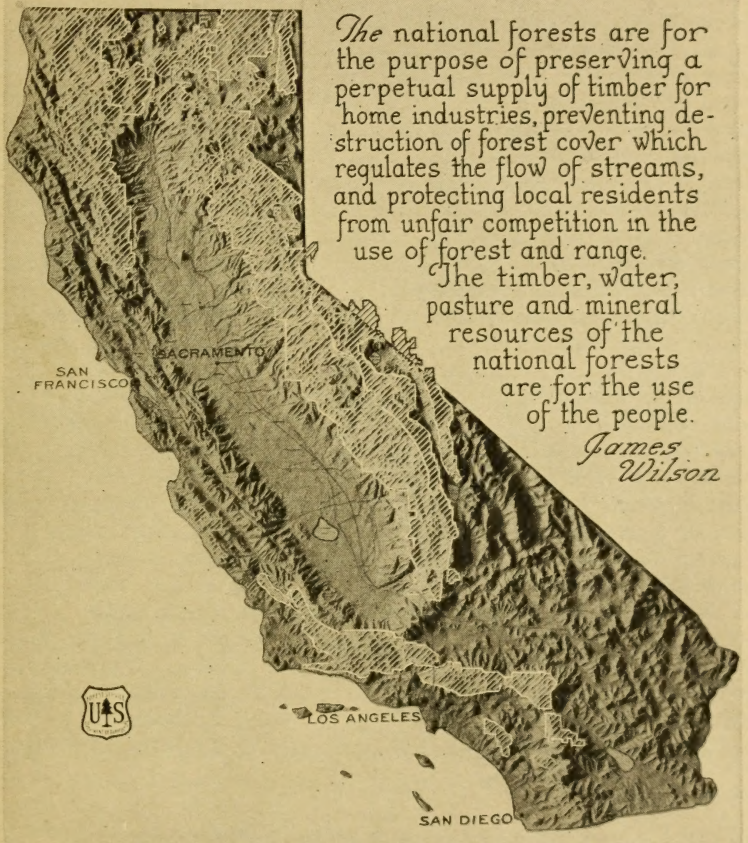

The national forests are for the purpose of preserving a perpetual supply of timber for home industries, preventing destruction of forest cover which regulates the flow of streams, and protecting local residents from unfair competition in the use of forest and range.

The timber, water, pasture and mineral resources of the national forests are for the use of the people.

James Wilson

UNITED STATES
DEPARTMENT OF AGRICULTURE
FOREST SERVICE
MISCELLANEOUS CIRCULAR NO. 94
Washington, D. C.

ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE

March 12, 1927

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35057

THE NATIONAL FORESTS OF CALIFORNIA

By ROBERT W. AYRES, Forest Examiner, and WALLACE HUTCHINSON, Assistant District Forester, Forest Service

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FORESTS AND PUBLIC OPINION

After a quarter century of effort by the conservationists, the problem of providing for adequate protection and wise use of forests and forest land in the United States is still one of the most pressing problems of the Nation. This problem can not be solved in its entirety by foresters and landowners. Public opinion must be aroused. The destructive use of the forests which created the present situation has been tolerated partly because of lack of general understanding of the results of unwise lumbering methods and of letting fire burn the woods. There is great need to-day for the public to become acquainted with the forests in a more intimate way, to know something of their extent and productivity, their relationship to the economic and social life of the Nation, and their consequent claim to direct interest on the part of every citizen in their wise use and perpetuation.

In the following pages the national forests of California are described and an account is given of their value to the public welfare and of the means and methods used by the United States Forest Service to make them contribute as much as possible, both now and in the future, to the prosperity and well-being of the people of the State and the Nation.

SPANISH CALIFORNIA KNEW LITTLE OF THE FORESTS

The Spanish explorers who were attracted to California in the early days were right in their assumption that the region possessed wealth beyond the dreams of avarice. But they missed the one kind of wealth they sought—gold—and they failed to realize the wealth that is in her forests and waters, wealth now being derived from a thriving timber industry and from prosperous irrigated farms and orchards.

The attraction that California has always had is reflected in the name itself, which probably originated with the legend of Montalvo, who wrote of the "romantic wonders and magazines of wealth of the island of California which lies at the right hand of the Indies."

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CALIFORNIA'S GREATEST NATURAL RESOURCE

The national forests of California cover nearly one-fifth of the total area of the State and contain resources valued at $300,000,000

Coronado, in 1535, searched Lower California for the "seven golden cities of Cibola." Yet for 150 years after the Pilgrims landed on the Atlantic coast California lay untouched by civilized man. It was not unknown to the world of that day, for Cabrillo had sailed along its coast in 1542 in search of a passage to India, and the English admiral Drake had landed and explored a small part of the coast north of the Bay of San Francisco in 1579, and after naming it "New Albion" had sailed away without having seen the bay itself.

Its real history began in 1769, when Junipero Serra, a Franciscan monk, landed in San Diego, claimed all of California—which was still believed to be an island—for Charles III of Spain, and began his labor of establishing the missions along the coast. In 1775 Juan de Alaya sailed through the Golden Gate and explored the Bay of San Francisco, first of all white men to do so.

The old Spanish civilization lay near the seacoast, and the Spanish settlers knew little of California's wealth. The Camino Real, or King's Highway, linked their white-walled abode churches from the Mission Dolores in San Francisco to the Mission San Diego de Alcala in San Diego. Between and around these missions the military officers obtained grants from the Spanish crown and founded a feudal aristocracy on ranchos whose area was measured in square leagues and whose boundaries lay on the distant hills. It was a pastoral society of the Old World—easygoing, pleasure loving—living in a country of magnificent distances, where the mountains came down to the blue waters of the Pacific.

The great central basins of California, formed by the valleys of the Sacramento and San Joaquin Rivers, were practically untouched by the Spanish. Nor did the Spanish colonists dream that the

IN THE DAYS OF '49 F-172746

Washing out gold with a rocker. California's forests have produced far greater wealth than the combined output of her world-famous mines

wealth of gold which Cortez had once sought lay in the ancient gravels of the foothill streams or was folded into the quartz ledges of the mountains, or that the rivers flowing down from 30,000 square miles of forests on the slopes of the Coast Range and the Sierra Nevada would one day produce power for industry and irrigate millions of acres of land. The steady trickle of immigrants, who had been coming over the Sierra since 1827, saw in this country an empire bounded on the north and east by mountains, on the south by a desert, and on the west by the Pacific and realized the value of the spacious harbors and the great valleys. The covetous eyes of the modern world looked upon an Arcadian civilization and envied it its possessions.

War with Mexico was declared by the United States in 1846, and in 1848 the State was surrendered by the Mexican governor. Then

followed closely the news of Marshall's discovery of gold, and the trickle of immigrants became a flood. The Argonauts poured into California by land and sea. San Francisco became a seaport. The pastoral era was ended and development began.

DEVELOPMENT OF CONSERVATION

California began very early to take thought for the care of her natural resources. Fortunately many of the pioneers and Forty-niners were not only gold seekers, but statesmen, scholars, and broad-minded, educated men. As early as 1850, the best thinkers of the State were urging scientific care of the forests. The magazines and newspapers of the seventies contained articles on forest conservation. In 1883 Governor Stoneman appointed a commission to look

F-199846

MISSION SANTA BARBARA

The Spanish civilization of early California days was centered around the white-walled adobe churches of the padres which dotted the Pacific Coast from San Diego to San Francisco

into the cutting of timber on the shores of Lake Tahoe, and this study later included a survey of the forest problem of the entire State.

A State board of forestry was appointed in 1885 and came to an end in 1892 after publishing two reports dealing mainly with losses from uncontrolled forest fires and wasteful lumbering.[1] By that time the Federal act of March 3, 1891, was in effect, authorizing the President to create by proclamation, "forest reserves," or national forests as they have been called since 1905. In 1892 there were four national forests in California. At present there are 18 forests, covering over 19,000,000 acres of Government land[2] and extending from Oregon to the Mexican boundary. These Federal forests include within their boundaries the main bodies of timber and impor-

[1] The second State board of forestry was appointed by Governor Pardee in 1905 and is still functioning.

[2] The national forests of the California district include something over 500,000 acres in Oregon and Nevada. The national forests in California alone contain about 18,600,000 acres.

tant watersheds of the Sierra Nevada and the Coast Range, and the watersheds of the Sierra Madre in southern California.

With the extension of national forests and their management in the public interest through a period of 20 years there has come to

A GROVE OF REDWOODS (SEQUOIA SEMPERVIRENS)

Nature in her beneficence has given to California the king of all forest trees, the Sequoia

the people of California a realization of the value of forest protection and perpetuation for the upbuilding and prosperity of the State. Forest-land owners, who heretofore have given little thought to the

production of future timber crops, are now seriously considering the possibilities of growing timber. This is as it should be, since there are in California nearly 1½ million acres of privately owned cut-over land which is producing but a small part of the timber it is capable of growing. To this total must be added the 50,000 acres of forest in the State that are annually cut over by lumbering operations, of which at least 40 per cent is left in an unproductive condition. To solve this problem of private forest-land use, effective fire protection must be developed and many acres now denuded of their forest growth or supporting only a stand of brush must be reforested; methods of timber cutting must be adopted that will preserve the young trees already on the ground, from which the future forest will

F-22305-A

A VIRGIN FOREST

The national forests of California include within their boundaries the main bodies of timber in the Sierra Nevada and Coast Ranges. These forests contain one-third of the timber resources of the State

come; and the cut must be so regulated that only the mature timber will be taken, and that at a rate not in excess of the annual growth of the forest. Even with the application of these measures it may take 50 or more years to reestablish a forest cover on many areas of cut-over and burned land.

In the solution of these problems many public-service organizations and individuals are now working hand in hand with the United States Forest Service and the State board of forestry. Valuable cooperation is also being given in forestry educational work and in fire prevention, and studies are being made for the purpose of determining the economic value of the forest as related to the State's industries, with a view of formulating a clear-cut forestry policy for California.

NATIONAL FOREST RESOURCES

TIMBER

During the Spanish-Mexican days Californians builded almost entirely of adobe. Sutter's sawmill in Eldorado County, where Marshall discovered gold, was probably the first lumber operation in the State. Placer mining called for timber for flumes and dams for storage water to operate the monitors and sluice boxes; quartz mining required timber to line the shafts and tunnels. So lumbering and the development of mines, reservoirs, and ditches began simultaneously.

Lumbering first started in the foothills of the Sierra Nevada and spread along the lower slopes as the mines extended and as the towns

F-200505

A FOREST SERVICE TIMBER SALE AREA

Under scientific forest management the national forests of California supply 300,000,000 feet of timber annually. Thrifty seed trees are left to insure a future timber crop, and all brush and débris is piled and burned in the winter to reduce the fire hazard

and cities grew in the valleys. It has been steadily working higher up the slopes of the mountains as the lower and more accessible timber has been cut. The Santa Cruz redwood region was logged as the cities along the coast grew, and later the industry spread to the region bordering the Pacific to the north of San Francisco. Southern California first drew on the scattering pine forests of the San Bernadino mountains.

California now cuts from her forests, which contain one-fourth of the timber on the Pacific coast, about 2 billion feet of lumber per year. Lumbering ranks fourth among the industries of the State, and the annual value of lumber products amounts to $62,000,000, of which $9,700,000 comes from the national forests. One of the most remarkable features of the situation, however, is the

extraordinary consumption of lumber, which reaches approximately 3½ billion feet per year. This is the largest amount consumed by any State in the Union. California, with 4,000,000 people, uses more lumber than New York State, with its population of 11,000,000 people, and three times as much per capita as the average for the entire country. California's lumber consumption is roughly twice its production. But inasmuch as about one-half of what is produced is shipped out of the State, California has to bring in, chiefly from the Pacific Northwest, some 3 billion feet annually to meet her needs for industry and development.

A large part of California's forests are located in the mountains. Some of these forests will never be cut over because of their value for watershed protection, while others will be too difficult to get at or too expensive to log. The remainder of the forest area, including the best stands of lowland timber, is being rapidly cut over to supply State consumption and an increasing export demand, so that unless vigorous steps are taken to insure more adequate forest protection, and reforestation on lands in private ownership, such as the recently begun planting in the redwood region, there will come a time when a timber shortage will be a reality.

As the private forest holdings are depleted the timberlands of the Government will become of increasing importance, and from these lands will come a large part of the domestic lumber and other woods products that are required for the development and prosperity of the State. Approximately 60 per cent of the forest area of California, which covers nearly a fifth of the State, is under Federal control. The present stand of timber in the national forests, exclusive of cordwood, is about 100 billion feet, valued at nearly $200,000,000 on the stump. The annual cut is approximately 300,000,000 feet, and the receipts from the sale of timber on the stump amount to $900,000. This cut, under scientific forest management, can in the future be doubled or even trebled, and continued for all time without reducing the forest capital.

The timber crop of the national forests is not harvested by the Government but by the lumbermen who buy "stumpage" under competitive bids. Cutting is done in accordance with the terms of carefully prepared contracts, and all trees to be cut are marked or designated by qualified forest officers. Thrifty trees and reproduction are left to furnish seed and form the basis of a future crop. This represents from 15 to 20 per cent of the original stand and will furnish a second timber crop in from 50 to 75 years.

Lumbermen who cut national forest timber are required to equip each donkey engine with an approved type of spark arrester to prevent sparks from setting fire to the woods, and to have on hand an adequate supply of shovels, axes, pails, etc., for fighting fires that may start. A force pump and 200 feet of hose must be carried on each donkey and the ground around the machine cleared of all inflammable material for a radius of 100 feet.

High-speed donkey logging with "high leads" is very destructive to the forest. Young trees often have their limbs or bark knocked off or are uprooted by the incoming logs, and very often all young tree growth is destroyed for a distance of 600 to 700 feet around the spar tree. Therefore, on national forest timber sales the

use of "high leads" over 35 feet from the ground and line speeds of over 500 feet per minute are prohibited.

Experiments conducted by the Forest Service have proved that from the standpoint of cost and the future growth of the forest the best method of logging is that in which horses, tractors, and big wheels are employed, because these cause a minimum of damage to young growth and do not bring fire into the woods.

The harvesting of a timber crop results in the leaving of a large amount of brush and débris on the ground, which, if not properly disposed of, constitutes a serious fire menace to the remaining forest. Because of this fact, the Forest Service requires that all brush resulting from cutting on timber sale areas shall be piled in compact piles for burning during the rainy season or winter months.

A MODERN SAWMILL PLANT F-200519

Lumbering ranks fourth among the industries of California in value of the products which enter into manufacturing. Great mills, such as this, help to utilize the timber crop of the national forests

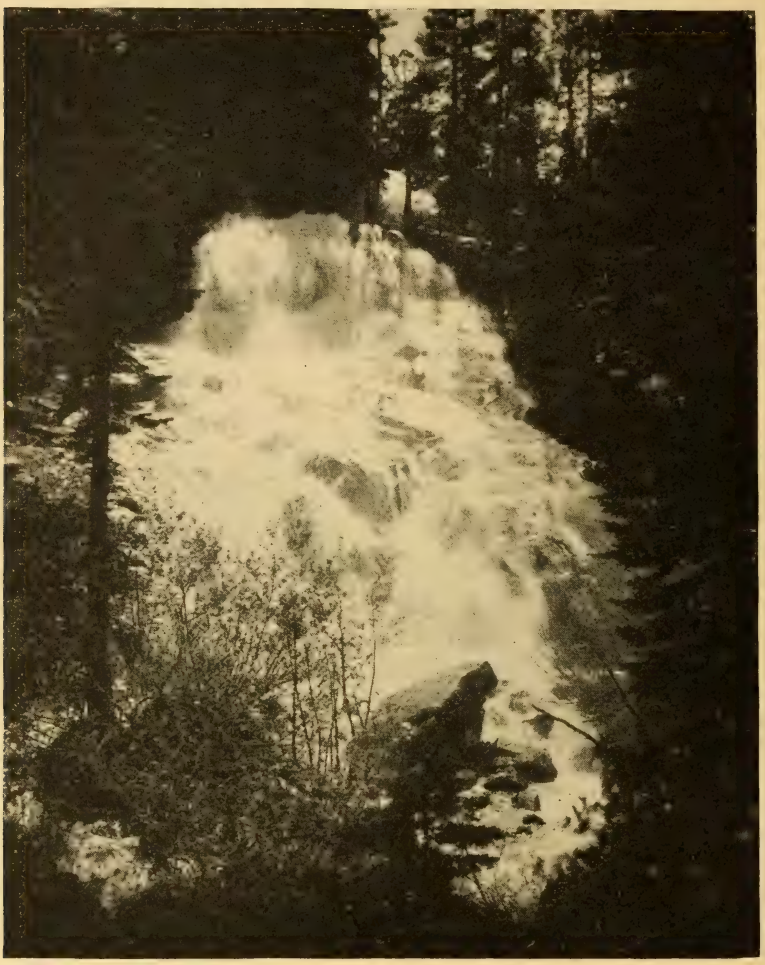
These piles are placed as far as possible from live trees and are carefully burned under the supervision of a forest officer.

All these measures have for their object the maximum production of wood from the national forests and the safeguarding of the valuable timber and other natural resources which are the property of the Nation.

WATER

In California, where water is the "white coal" of industry and the "gold" of agricultural prosperity, the vital importance of preserving the forest cover is apparent. Mistreat the forests or allow them to be damaged or destroyed by fire and the results are often floods, erosion, and destruction. Protect them from fire and cut them in a rational, conservative manner, with an eye to future forest pro-

duction, and they will repay the effort a thousandfold as protectors of valuable watersheds. Without forests or forest cover there can be no well-regulated supply of water for hydroelectric development, for irrigation, or even for municipal and domestic use.



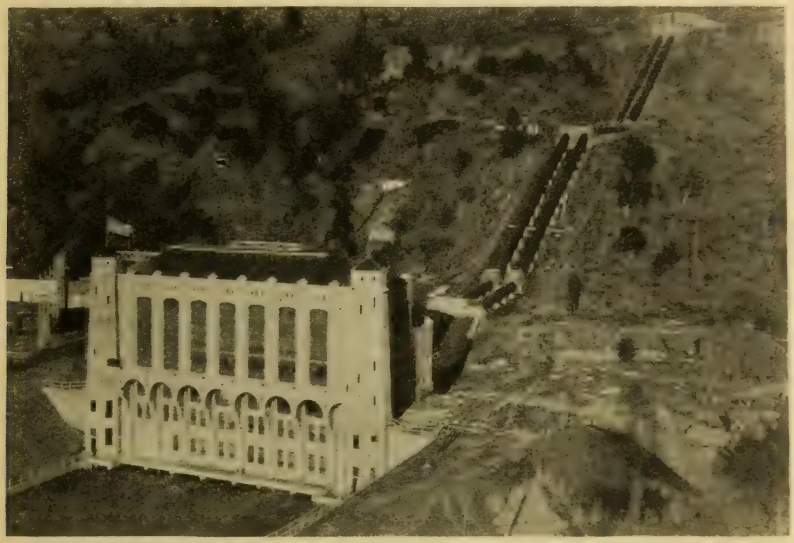
EAGLE CREEK FALLS, ELDORADO NATIONAL FOREST

Water, in California, is the "white coal" of industry and the "gold" of agricultural prosperity. Without forests or forest cover there can be no well-regulated supply of water

Power for transportation, industry, and the home is a prime necessity of our civilization. Hydroelectric power, however, is a development of the present century. The Forty-niners, with inexhaustible energy, laid the foundation of many of the present power and irrigation systems. They knew no obstacle when it came to building reservoirs for storing water and ditches to lead it to their

placer diggings. The foothills from Plumas to Mariposa Counties are scarred with their old works, some of them still in use to-day. Many of these projects are of such magnitude, like the canals now used by the Electra power plant, that one wonders how the miners could accomplish such feats in those pioneer days of the pick and shovel and black powder.

California stood first among all States in hydroelectric development and second in potential power resources in 1926. The total hydroelectric installation in the State in that year was 1,800,000 horsepower, and the potential development has been estimated at between five and six million horsepower. Like the lumber industry, the power companies are pushing farther and farther back into the mountains, harnessing the higher sources of water and developing



HYDROELECTRIC POWER HOUSE

California stands first among all States in hydroelectric development and second in potential power resources. National forests, managed and protected by the Government, assure an unfailing supply of water for power purposes

great chains of power houses from which the electric energy is carried hundreds of miles by high-power transmission lines to cities, towns, and farms throughout the State. To-day most of the water power in the State available for hydroelectric development is found within the national forests, which under Forest Service management and protection, barring unusual drought, assure an unfailing supply of water for power purposes. In the future there is a possibility that the development of the Colorado River, the headwaters of which are located in national forests of other States, will furnish a large percentage of the hydroelectric power used in California.

After hydraulic mining in California was curbed because of the silting of rivers and harbors, some of the old ditch and reservoir systems were gradually turned to use for local irrigation works or

water-supply projects for growing towns and irrigation districts. In 1848 there was no irrigated land in the State. Agriculture succeeded grazing on the most valuable lands, and vast areas were used for wheat and grain raising without irrigation in the eighties and nineties. In time the orange groves of the mission padres were extended by irrigation and other fruits were introduced, until to-day the value of the fruit crop is over $200,000,000, or an amount nearly equal to the combined value of the hay, grain, and vegetables produced in the State. California stands first among States in amount of irrigated and irrigable areas, and of the total acreage under irrigation at the present time it is estimated that more than one-half is watered by gravity from streams and lakes in the national forests.

IRRIGATED FARMS AND ORCHARDS

Of the 4,700,000 acres of agricultural land under irrigation in California more than one-half is watered from streams and lakes in the national forests

Of equal importance with power development and irrigation is the use of the waters from the national forests for domestic and municipal water supply. Many of the cities, towns, settlements, and farms of California are more or less dependent upon these forests for their water. Outstanding examples are Los Angeles, San Diego, Pasadena, Santa Barbara, and Sacramento. San Francisco, Oakland, Berkeley, and other east bay cities are also planning extensive development of national forest water resources for their domestic and municipal supply.

Considering all these important uses of water, it would be difficult to say what is the total value of the national forests of the State in terms of good health and prosperity.

FORAGE

Stock raising is the oldest industry in the State. The Spaniards brought cattle to Mexico from the West Indies in 1525 and took them into California as early as 1800 when they settled on the old land grants. In 1850 California ranked high in the numbers of cattle in the State, which were raised at that time principally for their hides. The mission padres brought sheep in 1773, and the horses which De Soto brought to Mexico in 1538, and abandoned, multiplied and spread over the western plains.

The herds and flocks belonging to the old Spanish aristocracy slowly passed, together with their land grants, into the hands of the Americans. The Americans herded their stock into the great interior valleys, hitherto grazed only by deer and antelope, and pushed high up into the timber and beyond to the mountain meadows of the Sierra

F-19819-A

CATTLE GRAZING IN THE NATIONAL FORESTS

Stock raising is the oldest industry in the State, and in early days was attended by violence and range wars. To-day the Forest Service effectively regulates the grazing on 24,000,000 acres of Government and private land within the national forests

Nevada. The pioneer stockmen had absorbed the spirit of their predecessors and dwelt in peace and with friendly understanding of each other's rights. Then came, in time, the foreign sheepmen, Basques, who knew or recognized no prior rights or range boundaries. There followed trouble and violence, range wars, and disregard of each other's welfare as still more stock of new settlers was crowded into the mountains. Forest fires burned uncontrolled over the summer ranges, pastures were trampled to dust and hillsides eroded, and the young timber was destroyed or eaten by the hungry sheep. Then came the inclusion of the mountain ranges in the national forests, with allotments to provide for all who should have a share in the range, both the settler with his few head and the owner who made his living by running a large number of stock.

Since that time there has been a marked improvement in the condition of the livestock industry in the national forests. Regu-

lated grazing has gradually revived the worn-out and depleted ranges; new pasturage has been opened in arid localities by the development of water. In certain regions plants which are poisonous to stock have been eradicated, and gradually the number of both cattle and sheep that graze on the mountain ranges has increased. Of the 19,000,000 acres of Government forests in the California district, 11,000,000 acres support forage and are grazed each year by 200,000 cattle and horses and 500,000 sheep and goats, returning a revenue in grazing fees to the United States Treasury of about $185,000 annually.

Including the patented land within national forests, there are now approximately 24,000,000 acres of grazing land under Forest Service

F-33343-A

SHEEP IN A HIGH SIERRA MEADOW

The mission padres brought sheep to California in 1773. Since that time the industry has grown and spread until to-day more than half a million sheep and goats are grazed on Government land under permit

regulation. There are 18,000,000 acres of public domain outside the national forests without any form of grazing regulation. Of the 27,500,000 acres of land in farms in the State, only 11,878,000 is improved, the remainder being used largely for grazing.

RECREATION

Although national forests are created primarily to maintain in a permanently productive and useful condition lands unsuited to agriculture but capable of yielding timber, water, and forage, there is another resource which is always present—recreation. Where there are areas of special "wilderness" or scenic value the policy of the Forest Service is to allow the proper and orderly utilization of

economic resources but not to permit the attractiveness or value of the areas for recreation to be impaired.

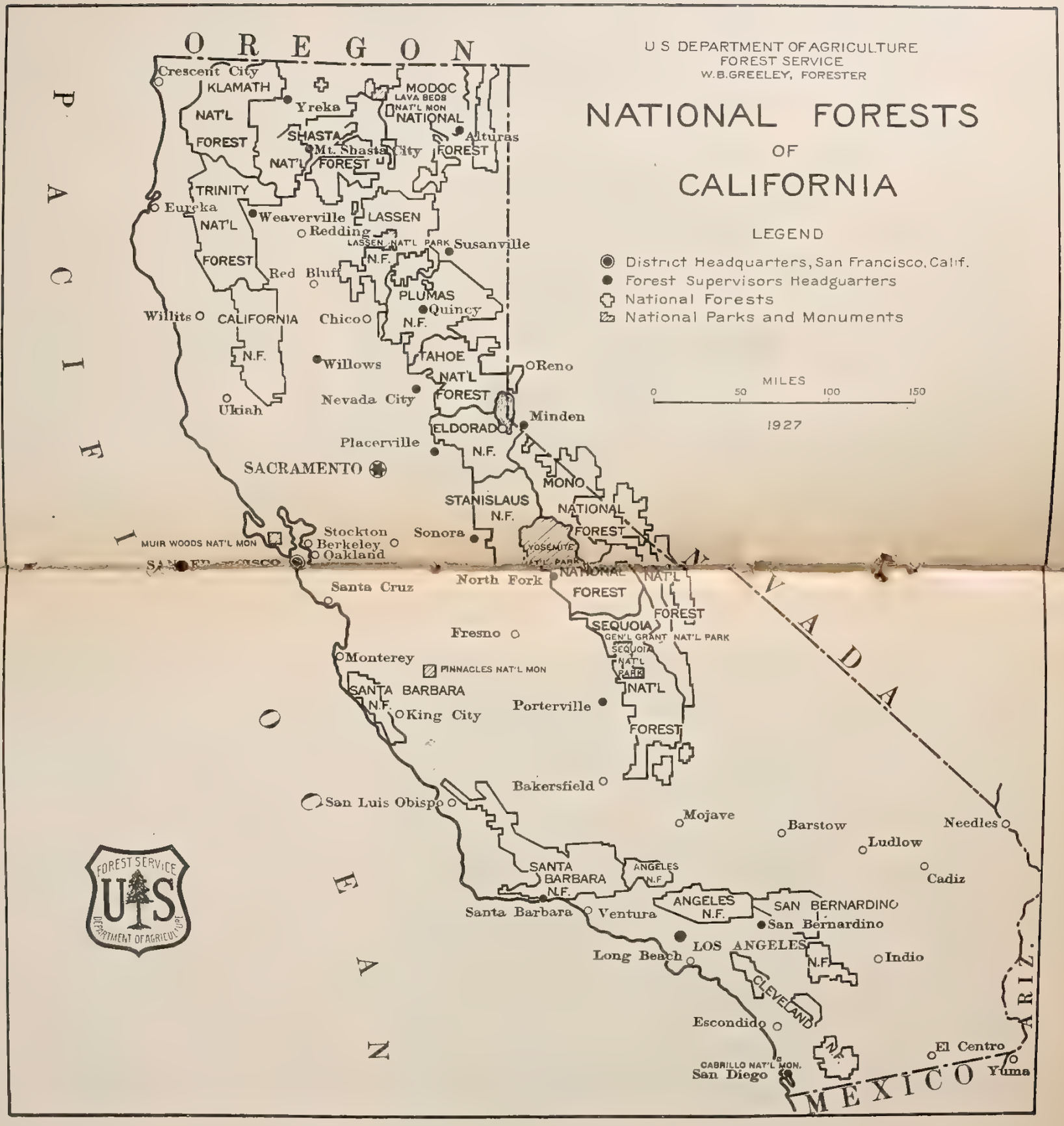
Until the present century it was the yearly practice of the valley settlers to load their families, cooking utensils, and bedding into the old farm wagons and camp for the summer in the mountains. Sportsmen made long and laborious trips with pack animals to favorite fishing or hunting grounds. The population of the entire State was then a little over a million, and travelers from the outside, if they went into the mountains at all, visited only a few of the well-known and easily accessible places of interest. But the automobile made as sudden and great a difference in the recreational uses of national forests as it has in the economic and social life of the Nation. In the last 10 years national forest travel in California has increased over

A FOREST CAMP GROUND

Motorists, campers, sportsmen, and vacationists use the national forests of California as summer playgrounds

800 per cent, and many of the visitors are from other States and from foreign countries. Over 90 per cent of all the travel into the national forests is by automobile. To provide for the comfort and convenience of these visitors and to reduce the man-caused fire hazard, the Forest Service has established in these national forests over 400 public camp grounds, many of which have simple camping and sanitary facilities. Free use of these forest camps is invited.

Many of those who come to the forests return annually to some permanent camp or summer home built on land leased from the Forest Service. There are now in effect in the national forests 5,000 permits for summer cabins, each occupying about a quarter-acre of land. The two favorite summer-home regions are in southern California and along the main roads across the Sierra Nevada. Municipalities of the State have also established in the national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Mt. Shasta City
Alturas FOREST
TRINITY NAT'L FOREST
Eureka
Weaverville
LASSEN NAT'L FOREST
Redding
Susanville
LASSEN NAT'L PARK
Red Bluff
PLUMAS N.F.
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Willits
CALIFORNIA N.F.
Chico
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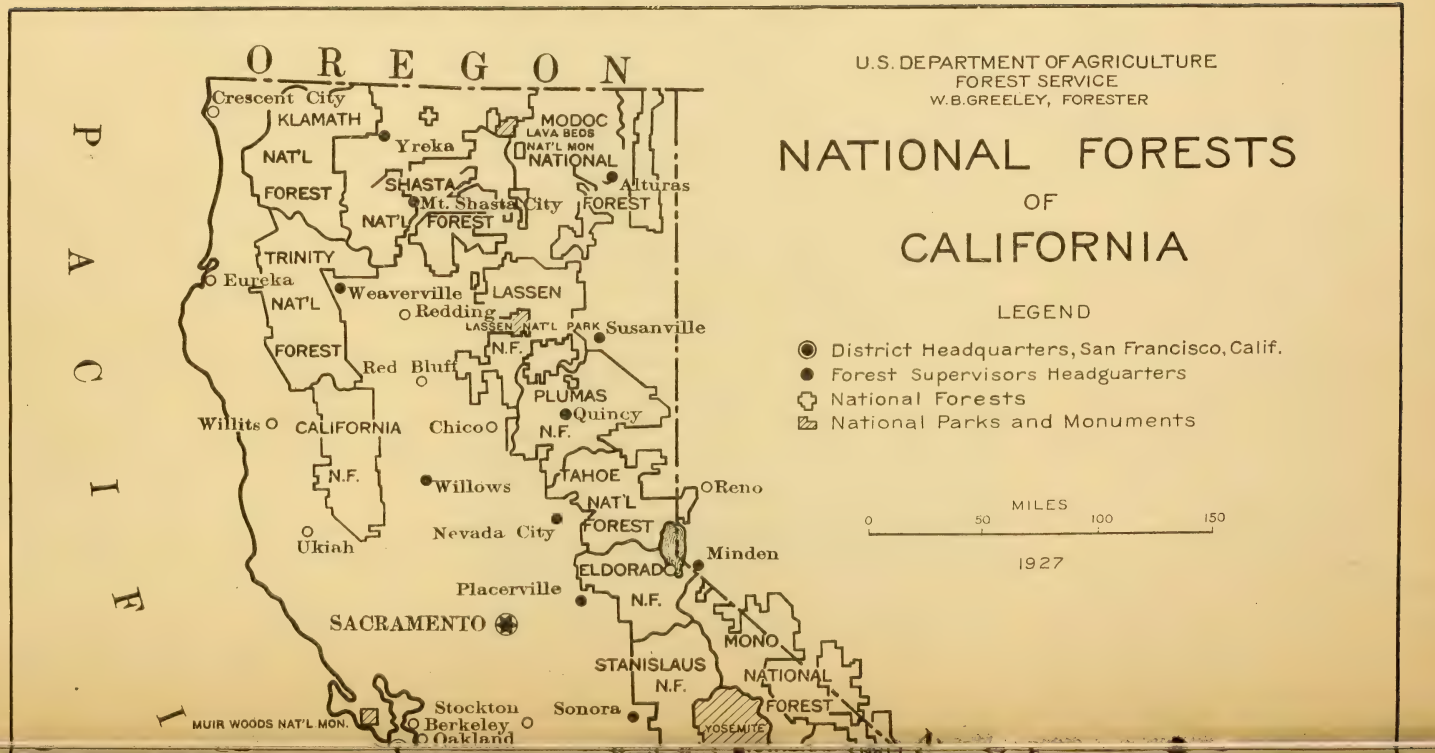
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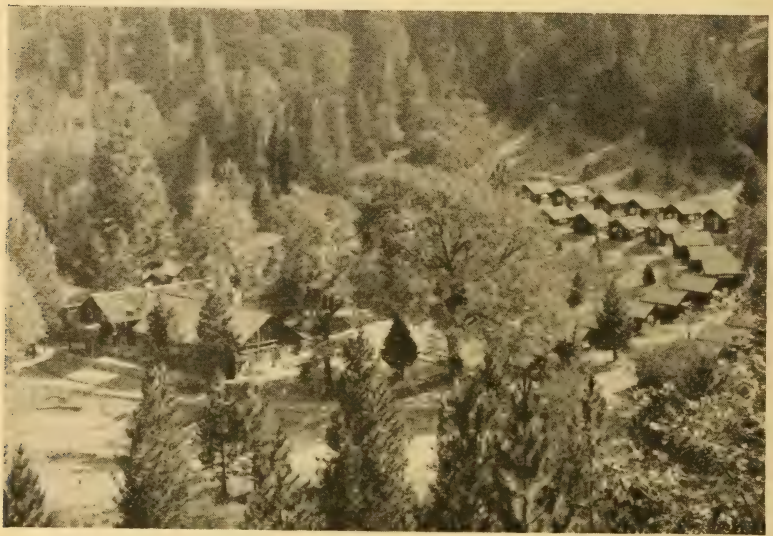
FOREST
Yreka
MODOC
LAVA BEDS
NAT'L MON
NATIONAL
FOREST
SHASTA
Mt. Shasta City
NAT'L
FOREST
Alturas
TRINITY
Eureka
NAT'L
FOREST
Weaverville
LASSEN
Redding
LASSEN NAT'L PARK
Susanville
N.F.
Red Bluff
PLUMAS
Quincy
N.F.
Willits
CALIFORNIA
Chico
N.F.
Willows
TAHOE
NAT'L
FOREST
Reno
Ukiah
Nevada City
Minden
ELDORADO
N.F.
Placerville
SACRAMENTO
MONO
NATIONAL
FOREST
STANISLAUS
N.F.
MUIR WOODS NAT'L MON.
Stockton
Berkeley
Oakland
Sonora
YOSEMITE
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
W.B.GREELEY, FORESTER
NATIONAL FORESTS
OF
CALIFORNIA
LEGEND
District Headquarters, San Francisco, Calif.
Forest Supervisors Headquarters
National Forests
National Parks and Monuments
MILES
0
50
100
150
1927

Santa Cruz
FOREST
FOREST
SEQUOIA
GEN'L GRANT NAT'L PARK
Fresno
SEQUOIA NAT'L PARK
Monterey
PINNACLES NAT'L MON.
SANTA BARBARA N.F.
King City
Porterville
NAT'L FOREST
Bakersfield
San Luis Obispo
Mojave
Barstow
Needles
Ludlow
Cadiz
SANTA BARBARA N.F.
ANGELES N.F.
ANGELES N.F.
SAN BERNARDINO
Santa Barbara
Ventura
San Bernardino
LOS ANGELES
Long Beach
N.F.
Indio
CLEVELAND
Escondido
El Centro
CABRILLO NAT'L MON.
San Diego
Yuma
MEXICO
ARIZ.
NEVADA
PACIFIC OCEAN
FOREST SERVICE
U S
DEPARTMENT OF AGRICULTURE

forests mountain recreation camps for their citizens. To-day Los Angeles maintains four such municipal camps; Oakland and Berkeley two each; and San Bernardino, Stockton, Sacramento, and Riverside one each. In these municipal camps thousands obtain a summer vacation at small cost. Many camps have also been established by clubs, organizations, and public service companies.

Included within the boundaries of California's national forests are many noted and nationally known scenic attractions, of which the most important are:



CAMP SEELEY, SAN BERNARDINO NATIONAL FOREST F-200592

Municipalities of California have established mountain recreation camps in the national forests where thousands of citizens obtain a summer vacation at small cost

Scenic attractions	National forest
Marble Mountain and Klamath River region	Klamath.
Mount Shasta, 14,380 feet	Shasta.
Silver Lake region	Lassen.
Feather River and Lakes Basin	Plumas.
Lake Tahoe	Tahoe-Eldorado.
Calaveras Groves of Big Trees	Stanislaus.
Huntington Lake	Sierra.
Mammoth Lakes region	Inyo.
Mount Whitney, 14,501 feet, the highest peak in continental United States[3]	Do.
Kings River region	Sequoia, Sierra, and Inyo.
Monterey region	Santa Barbara.
Mount Wilson, Mount Lowe, and San Gabriel and Big Tujunga Canyons	Angeles.
Rim of the World Drive and Big Bear Lake	San Bernardino.
Desert View, Laguna Recreation Area	Cleveland.

[3] The summit of Mount Whitney is on the boundary between the Sequoia National Park and the Inyo National Forest.

WILD LIFE

A national forest resource which never fails to attract and interest visitors is the wild life of the mountain regions. Game animals, game birds, and fish here find their natural home and offer many and varied subjects of sport and study for the hunter, fisherman, and photographer.

All the species of large game found in California have at least a part of their habitat in the national forests. A recent census by Forest Service officers shows that in these forests there are more than 225,000 deer, 10,000 bear, 1,000 mountain sheep, 400 antelope, and 150 elk. The number of predatory animals is estimated to be: Coyote, 50,000; lynx and wildcat, 22,000; mountain lion, 2,000.

Throughout the national forests are areas of varying size which are the feeding and breeding grounds of game animals and birds. In these regions one Federal and 31 State game refuges have been

F-200700

THE EVENING CAMP FIRE

There is something about the snap of blazing pine logs and the tang of fir smoke that seems to fascinate the summer vacationist

established in which no hunting is permitted and where game can, unmolested, multiply and with the overflow stock the surrounding country.

The more important species of fur-bearing animals in the forest are fox, marten, mink, skunk, and badger; other species are ermine, fisher, raccoon, and otter.

In the thousands of streams and lakes of the Sierra Nevada, Coast Range, and mountains of southern California are trout and other species of game fish. These waters are kept well stocked by the State in cooperation with Federal authorities and with associations and private individuals, and offer keen sport to the angler.

Fishing and hunting are permitted in the national forests, subject to the provisions of the State fish and game laws.

The mountains are the natural home of wild life, and in the forest and the open glades and brush fields game animals and

F-172740

FLASHLIGHT OF A DEER

There are more than 225,000 deer in the national forests of California

F-206333

FISHERMAN'S LUCK

The thousands of streams and lakes of the national forests in California offer keen sport to the angler

birds feed and have their home. The melting snow and rain seep through the forest floor and provide an unfailing supply of water for streams and lakes—the home of game fish. When fire sweeps through the forest and the trees and brush cover are destroyed, game animals are either driven out or killed, the streams dry up, the fish disappear, and the beauty spots of nature are turned into desolate wastes.

ADMINISTRATION OF NATIONAL FORESTS

The Federal "forest reserves" in California were transferred to the Department of Agriculture and became "national forests" in 1905. They have, therefore, been under administration as national forests for more than 20 years. With the change in name came an altered conception of what the forests should be. By and large, their

F-199850

FOREST RANGER

The forest ranger is the custodian and manager of the Government's and people's interests in the national forests

development has been the outcome of the viewpoint which sought usefulness of the resources for all the people in place of "reservation" solely for the future. The national forests have thus become a permanent public undertaking, their purposes understood and indorsed.

The unit of national forest administration is the ranger district, in charge of a district ranger. He is the local representative of the Forest Service whose duty it is to protect the forest from fire, regulate and supervise the grazing of stock and the sale of timber, and oversee the building of trails, telephone lines, and all other improvements necessary for the use and protection of his district. Briefly, the forest ranger is the custodian and manager on the ground of the Government's and the people's interests.

A certain number of ranger districts form a national forest, the boundaries of which are determined largely by topographic features. A forest supervisor, who is the business and resource manager and executive of this larger unit, is in charge, with ample authority and

discretionary powers to care for and develop to the fullest use the resources under his jurisdiction.

The Federal forests in various States or regions are further grouped together into national forest districts, as, for example, the national forests of California and southwestern Nevada, which constitute the California district. Each such district is in charge of a district forester, who gathers into his headquarters office the executive heads necessary to coordinate and administer all lines of work and activities on the forests. His office includes a fiscal agent, and technicians in charge of forest management, grazing, research, and other forms of scientific work which apply to the district as a whole. The district forester also deals directly with the State board of forestry, State fish and game commission, State

F-200538

A SUMMER HOME IN THE FOREST

Five thousand summer homes have been built in the national forests of California on land leased from the Forest Service

highway commission, and other organizations, both public and private, in State-wide cooperative work. The national forests as a whole are administered by the Forester whose headquarters are at Washington, D. C.

NATIONAL FOREST RECEIPTS

The total value of all resources in the 18 national forests of the California district is conservatively estimated at $300,000,000. The receipts of these forests, which accrue from sales of timber, grazing fees, water power, special-use permits, and other miscellaneous business, have totaled in recent years more than $1,000,000 annually.

Under existing laws 25 per cent of these receipts are returned, in lieu of taxes, to the State for distribution to counties for road

and school development. An additional 10 per cent of the receipts is also expended by the Forest Service for roads and trails in the national forests. Since the passage of these laws in 1908 and 1913, respectively, more than $3,500,000 of national forest receipts have been returned to or expended in the State for schools, roads, and trails.

ROADS AND TRAILS

With the growing interest and activity in the construction of better roads throughout the Nation, there has come a general demand for Federal-aid roads traversing the national forests. Congress, in taking action on this demand, has recognized that forest roads are

LAKE TAHOE. "THE GEM OF THE SIERRAS"

It must surely be the fairest picture the whole earth affords.—MARK TWAIN

required (1) to facilitate the administration, protection, and development of the Government's own properties in order that they may be safeguarded and made of maximum service to the public; (2) to serve as essential links in the public highway system constructed and maintained in cooperation with States and counties. A number of measures have therefore been enacted since 1912 under which nearly 1,200 miles of roads and 2,200 miles of trails have been constructed within or adjacent to the national forests of the State. In addition to this work, over 2,500 miles of existing roads and approximately 7,000 miles of trails are maintained in a satisfactory condition for travel. The allotment for roads and trails in the national forests of California is now nearly $1,250,000 annually, and

the total of Federal funds expended to date on this work is in excess of $7,800,000.

The Bureau of Public Roads, in cooperation with the Forest Service and the State highway commission, locates and constructs the more important road projects. In the building of the cheaper roads and in trail work the Forest Service utilizes its field organization of supervisors, rangers, and other officers and correlates this work with its fire-control activities by placing construction crews where they will be available for fire suppression during danger periods.

FOREST FIRES

There are only two main causes of fires in the forest—lightning and the human race.

THE CALL OF THE OPEN ROAD PHOTO BY C. M. HILLER

Nearly $1,250,000 is expended each year by the Forest Service on roads and trails in the national forests of California, and the total of funds expended to date on such work is in excess of $7,000,000

The record of the past has been read in the fire and lightning scars found in the annual rings of the trees themselves. In California the giant Sequoias show that fires occurred as long ago as the year 245 A. D., and there is plain proof that since 1685 fires have swept the pine forests periodically.

There is a tradition that the Indians in past centuries burned the forest more or less regularly for protection and the easier hunting of game. For this they are praised with an ulterior motive as the first foresters. The records of early explorers and the testimony of the oldest miners, however, contradict this tradition and indicate that extensive man-caused fires began in California after the advent of the settlers. The early reports of forest fires by Hough and the California State Board of Forestry make it clear that fires caused

by white men were both common and extensive and more numerous than the fires that occurred before their advent. This agrees with the conclusions reached through the study of fire scars found in the forests.

Human agency was and is the chief cause of forest fires; and as population increases, as industries such as grazing, railroading, and lumbering develop, and as travelers increase in number, so does danger from forest fires increase. To-day the rapidly expanding industrial developments in the mountain regions and the ubiquitous motor car bring into the forests an ever-increasing number of inexperienced travelers, unfamiliar with this malignant enemy of the forests, and an increasing source of fire hazard.

The Forest Service must oversee these users and educate them to the care of their own property, and this task is becoming more difficult each year. At the same time the forests themselves are gradually becoming more difficult to protect and are also increasing in value. Hazards are increasing as more privately owned stumpage

PHOTO BY VAN MONTGOMERY F-1191151

AIRPLANE VIEW OF A FOREST FIRE

Human agency is the chief cause of forest fires. Seventy per cent of all the fires that occur in California are due to carelessness

is cut without adequate disposal of the slash and débris. Stands of young timber, the future sources of lumber and the most valuable asset to conservation, are growing up and, being highly inflammable, are subject to severe damage by fire. The population of the State is growing rapidly, and the industries dependent on the forests, such as water power, irrigation, grazing, and lumbering, are increasing in economic value. It is clear then that both the value of and the hazards to the forests of California are steadily becoming greater.

In the effort to handle adequately the task of forest protection the Forest Service is continually improving its fire-fighting methods and protective organization. Firebreaks, roads, trails, and telephone lines are being extended; areas containing inflammable growth of brush or other material of low forest value but of high fire hazard are being cleaned up; the forest personnel is annually trained in fire-fighting technic; studies are made of the causes of fires and the best method of combating them; lookout systems are perfected and the airplane and radio are called upon to help. Extensive educa-

F-35769-A

IN THE WAKE OF THE "RED TERROR"

Fires in California, on the average, burn over each year more than 600,000 acres of forest, brush, and grass lands and cause damage to timber, watershed cover, forage, and improvements of over $1,000,000

F-156397

ONE OF CALIFORNIA'S FORESTRY PROBLEMS

There are 1,500,000 acres of privately owned cut-over land in the State which is producing but a small part of the timber it is capable of growing. To solve this problem there must be developed effective forest protection, reforestation, preservation of young tree growth, and regulation of cut

tional campaigns are also carried on with the cooperation of public organizations and individuals. Yet the continuous pressure of growing danger makes it necessary that an enlightened and cooperative public spirit shall realize the values at stake and aid in the fight against the greatest of all menaces to the use and perpetuation of the forests.

Careful and open-minded studies into the whole subject of forest fires in California have been going on for many years. An idea of the cumulative effect of fires may be gained from the proved fact that already the virgin timber has been burned from 1 acre out of every 7 and that on the remainder the amount of wood has been reduced to from one-third to one-half of what the land could produce. To restore the enormous potential productivity of this national property is the present-day problem.

California's prosperity, as exemplified by her fruit and farm crops, hydroelectric development, lumber and livestock industries, recreational advantages, and her thousands of happy homes, is inseparably linked with the wealth of resources provided by her national forests. To use wisely and to perpetuate these valuable natural resources, which are the property of all citizens, is the duty not only of foresters but of every Californian who has at heart the welfare of the Golden State.

APPENDIX

LIST OF NATIONAL FORESTS WITH HEADQUARTERS AND NET AREA, CALIFORNIA DISTRICT

(District headquarters, Ferry Building, San Francisco, Calif.)

National forest	Headquarters	Area Government land (acres)
Angeles	Federal Building, Los Angeles, Calif.	646,192
California	Federal Building, Willows, Calif.	822,735
Cleveland	Federal Building, San Diego, Calif.	380,109
Eldorado	Placerville, Calif.	551,478
Inyo	Bishop, Calif.	1,638,248
Klamath	Yreka, Calif.	1,525,257
Lassen	Susanville, Calif.	944,292
Modoc	Alturas, Calif.	1,479,005
Mono	Minden, Nev.	1,260,536
Plumas	Quincy, Calif.	1,107,947
San Bernardino	San Bernardino, Calif.	597,301
Santa Barbara	Federal Building, Sanat Barbara, Calif.	1,772,555
Sequoia	Porterville, Calif.	1,450,133
Shasta	Mount Shasta, Calif.	868,373
Sierra	Northfork, Calif.	1,492,617
Stanislaus	Sonora, Calif.	810,632
Tahoe	Nevada City, Calif.	516,714
Trinity	Weaverville, Calif.	1,410,202
Total		19,265,326

NATIONAL FORESTS, PARKS, AND MONUMENTS

In order that the public may understand the essential differences between national forests, national parks, and national monuments, it is necessary to point out the basic standards underlying the establishment and administration of these Federal areas.

The principle of use of resources is the vital distinction between national forests on the one hand and national monuments and

national parks on the other. National forests are created to protect and maintain in a permanently productive and useful condition lands unsuited to agriculture but capable of yielding timber or other general benefits, such as forage for livestock and water for irrigation, domestic use, and power. All of the resources of the national forests are developed and used to the greatest possible extent consistent with permanent productivity under the principle of coordinated use. Camping and hunting and fishing in season are permitted in the national forests of California, but a camp-fire permit must first be obtained before any form of outdoor fire, including fire in stoves burning wood, kerosene, or gasoline, is built on Government land. National forests are administered by the Forest Service of the United States Department of Agriculture.

National parks are natural preserves for the recreation and education of the people. They are created to preserve objects of outstanding scenic, geologic, or historic interest, and the plant and wild life under nature's chosen conditions. All national parks are game sanctuaries, and are protected completely from all utilitarian and commercial enterprises save those necessary for and subservient to legitimate park uses. There are four national parks in California—Yosemite, Sequoia, Lassen Volcanic, and General Grant—which cover an area of approximately 1,200,000 acres. National parks are under the jurisdiction of the National Park Service of the Department of the Interior.

National monuments, although of small size and lesser importance than the national parks, are created for the same basic purposes. There are five national monuments in California, as follows:

Name	Location	Administered by—
Cabrillo	San Diego County	War Department.
Devil Postpile	Sierra National Forest	United States Forest Service.
Lava Beds	Modoc National Forest	Do.
Muir Woods	Marin County	National Park Service.
Pinnacles	San Benito County	Do.

STATE PARKS

In addition to Federal forest and park areas, California also possesses five State parks with a total area of 13,000 acres, nearly 12,000 acres of which is located in the redwood regions of Santa Cruz, Humboldt, and Del Norte Counties. Following is a list of State parks:

Name	Location	Administered by—
California State Redwood Park	Santa Cruz County	California State Redwood Park Commission.
Humboldt State Redwood Park	Humboldt and Del Norte Counties.	State board of forestry
Burney Falls State Park	Shasta County	Do.
General Bidwell State Park	Butte County	Do.
Mount Diablo State Park	Contra Costa County	Special commission appointed by governor.

PHOTO BY RAMSEY

MOUNT WHITNEY (14,501 FEET), INYO NATIONAL FOREST

Telephoto view of the beacon of the Sierras and the highest peak in continental United States

FOREST STATISTICS, STATE OF CALIFORNIA

[Compiled for the Senate Select Committee on Reforestation, 1923]

Ownership	Total forest land area [1]	Present virgin timber area	Present virgin timber stand	Deforested area cut and burned
	Acres	*Acres*	*M feet b. m.*	*Acres*
Private	6,782,000	4,406,000	187,775,000	2,376,000
State	95,000	95,000	230,000	0
Federal	12,319,000	10,531,000	96,500,000	1,788,000
Total	[2] 19,196,000	[3] 15,032,000	[4] 284,505,000	[5] 4,164,000

[1] Land that is in forest or that is potential forest land.
[2] 19.3 per cent of entire State land area.
[3] Pine region, 13,963,000 acres: redwood region, 1,069,000 acres.
[4] Pine region, 208,330,000 M feet b. m.; redwood region, 76,175,000 M feet b. m.
[5] Pine region: Cut-over but restocking, 1,049,000 acres; requires replanting, 589,000 acres. Burned-over land and brush fields, restocking, 1,200,000 acres; not restocking, 600,000 acres.
Redwood region: Cut-over lands, restocking, 436,000 acres; not restocking, 125,000 acres. Brush fields, restocking, 125,000 acres; not restocking, 40,000 acres.

ESTIMATED STAND OF GOVERNMENT TIMBER IN NATIONAL FORESTS OF CALIFORNIA

Species	Total stand M feet b. m.	Species	Total stand M feet b. m.	Species	Total stand M feet b. m.
Yellow pine	31,192,012	Lodgepole pine	2,634,906	Coulter pine	30,000
Douglas fir	16,476,048	Jeffrey pine	1,925,605	Miscellaneous species	150,583
White fir	14,461,403	Redwood	258,147		
Red fir	12,934,782	Bigcone spruce	165,375		
Sugar pine	11,655,089	White pine	151,681	Total	96,515,813
Incense cedar	4,404,971	Hemlock	75,211		

Cordwood, 26,414,739 cords.

TIMBER CUT IN CALIFORNIA, 1924

[United States census]

Region	Total cut	Value of lumber product
	M feet b. m.	
Pine	[1] 1,305,823	$42,338,452
Redwood	690,929	20,539,326

[1] 304,427 M feet b. m., cut from national forests; value in the tree, $912,000; approximate value of lumber product, $9,700,000.

PRODUCTION OF LUMBER IN CALIFORNIA,[1] 1923 AND 1924

[United States census]

Number of mills reporting		Lumber cut[2] (M feet b. m.)		Percentage of increase or decrease
1923	1924	1923	1924	
214	181	2,118,094	1,996,496	−5.7

[1] Includes a small amount of lumber cut in western Nevada.
[2] Not including production of mills cutting less than 50,000 feet.

CONSUMPTION OF LUMBER IN CALIFORNIA, 1920, 1922, 1923, AND 1924

Year	Total consumption[1]	Per capita consumption[1]
	M feet b. m.	*Feet b. m.*
1920	2,174,517	625
1922	3,248,572	865
1923	4,288,705	1,105
1924	3,579,755	860

[1] Domestic lumber only. The inclusion of lumber imported from foreign countries would raise the stated per capita consumption by 25 feet in 1924 and an average of 10 feet in previous years. The total per capita consumption of the United States, including imports, was 285 feet in 1922, 330 feet in 1923, 310 feet in 1924, and 325 feet in 1925.

GRAZING, NATIONAL FORESTS OF CALIFORNIA

Area of grazing land, acres		11,389,000
Average number of stock grazed:		
Cattle and horses	207,129	
Sheep and goats	506,000	
Total		713,129

HYDROELECTRIC POWER FROM STREAMS IN CALIFORNIA

[Federal Power Commission]

Total horsepower developed to 1926	1,800,000
Potential horsepower, estimated	5,000,000
Estimated power developed from streams in national forests	1,028,000

IRRIGATED LANDS, STATE OF CALIFORNIA

	Acres
Irrigated by gravity water, 1919	[1] 2,660,578
Total area under irrigation, 1924	[2] 4,700,000
Water supply available for	[3] 6,200,000
Total potential irrigable area	[4] 18,000,000

Over two-thirds of all the irrigated lands in the State are dependent on the national forests for their water supply.

FARMING, STATE OF CALIFORNIA

[United States 1925 farm census]

	Acres
Total farm acreage	27,565,440
Crop land, 1924 [5]	8,402,195
Pasture, 1924	16,907,167
Woodland, not pastured	447,489
All other land	1,808,589
Value of field and fruit crop, 1925	[6] $458,469,000

During the period 1920 to 1925 the number of farms in California increased from 117,670 to 136,409, or an increase of 18,739 farms. The average acreage of these farms is 202.1 acres.

FIRE RECORD, STATE OF CALIFORNIA

Year	Total number of fires (timber, brush, and grass)	Number of man-caused fires	Area burned (acres)			Damage			Suppression costs (Federal, State, and private)
			Timbered	Non-timbered [a]	Total	Timber	Other damage [b]	Total	
1920	1,795	1,142	124,622	281,416	406,038	$380,859	$185,890	$566,749	$211,564
1921	2,245	2,028	30,148	620,576	650,724	67,851	562,794	630,645	205,915
1922	1,978	1,708	103,174	550,098	653,272	211,035	437,725	648,760	296,051
1923	2,240	1,548	103,636	838,929	942,565	197,922	1,644,302	1,842,224	245,724
1924	2,657	1,872	436,899	548,140	985,039	1,312,897	1,089,780	2,402,677	1,329,543
1925	2,614	1,114	20,618	163,093	183,712	109,886	151,017	260,903	250,435
6-year average	2,255	1,569	136,516	500,375	636,892	380,075	678,585	1,058,660	423,205

[a] Brush, grass, and weed areas.
[b] Includes damage to reproduction, forage, improvements, etc.

[1] United States census.
[2] Irrigation report, Commonwealth Club of San Francisco.
[3] Division of engineering and irrigation, State department of public works.
[4] A deficiency in crop land in California occurred in 1924, due to prolonged drought. The normal area of improved lands in farms in the State, as given in the 1920 census, is 11,878,339 acres.
[5] United States and State departments of agriculture.

FIRE RECORD, NATIONAL FORESTS OF CALIFORNIA

Year	Total number of fires	Number of man-caused fires	Area burned (acres)[1]			Total damage [3]	Cost of fighting fires
			Government	Private [2]	Total		
1920	1,338	697	129,798	34,659	164,457	$177,967	$159,535
1921	1,196	991	122,612	23,968	146,580	34,443	137,264
1922	1,028	772	190,001	26,054	216,055	188,646	189,008
1923	1,372	722	145,287	33,762	179,049	71,965	151,666
1924	1,932	1,184	401,221	360,931	762,152	1,251,911	1,191,271
1925	1,915	537	51,209	47,775	98,984	99,019	207,929
6-year average	1,463	817	173,354	87,858	261,212	303,992	339,445

[1] Includes timbered and brush areas.
[2] Includes private lands burned over both inside and adjacent to national forests.
[3] Exclusive of damage to watersheds, wild life, and recreational resources. Does not include damage to private lands outside national forests.

PHOTO BY R. E. STINSON

MOUNT SHASTA (14,380 FEET) "THE QUEEN OF THE SISKIYOUS"

This magnificent snow-capped peak in the Shasta National Forest is the most beautiful mountain in California and the lodestone of recreationists

TREES OF CALIFORNIA

Alder: Mountain (*Alnus tenuifolia*).
Red (*Alnus rubra*).
White (*Alnus rhombifolia*).
Ash: Flowering (*Fraxinus dipetala*).
Oregon (*Fraxinus oregona*).
Aspen (see Poplar).
Bigtree (*Sequoia washingtoniana*).
Birch: Red (*Betula fontinalis*).
Boxelder (see Maple).
Buckeye, California (*Aesculus californica*).
Cedar: Incense (*Libocedrus decurrens*).
Port Orford (*Chamaecyparis lawsoniana*).
Western red (*Thuya plicata*).
Cottonwood (see Poplar).
Cypress: Gowen (*Cupressus goveniana*).
Monterey (*Cupressus macrocarpa*).
McNab (*Cupressus macnabiana*).
Pigmy or Dwarf (*Cupressus pygmaea*).
Fir: Bristlecone (*Abies venusta*).
Douglas (*Pseudotsuga taxifolia*).
California Red (*Abies magnifica*).
Shasta Red (*Abies magnifica shastensis*).
White (*Abies concolor*).
Golden Chinquapin (*Castanopsis chrysophylla*).
Hemlock: Mountain (*Tsuga mertensiana*).
Western (*Tsuga heterophylla*).
Juniper: California (*Juniperus californica*).
Madroño (*Arbutus menziesii*).
Maple: Bigleaf (*Acer macrophyllum*).
California Boxelder (*Acer negundo californicum*).
Dwarf (*Acer glabrum*).
Vine (*Acer circinatum*).
Nutmeg (*Tumion californicum*).
Oak: California shin (*Quercus breweri*).
California black (*Quercus Kelloggii*).
California blue (*Quercus douglasii*).
Canyon live (*Quercus chrysolepis*).
Coast live (*Quercus agrifolia*).
Evergreen black (*Quercus morehus*).
Oak—Continued.
Evergreen white (*Quercus engelmannii*).
Highland live (*Quercus wislizenii*).
Huckleberry (*Quercus chrysolepis vaccinifolia*).
Oregon white (*Quercus garryana*).
Sadler (*Quercus sadleriana*).
Scrub (*Quercus dumosa*).
Tan (*Lithocarpus densiflora*).
Valley white (*Quercus lobata*).
Oregon myrtle (*Umbellutaria californica*).
Palm: California (*Washingtonia filamentosa*.
Pine: Bishop (*Pinus muricata*).
Bristlecone (*Pinus aristata*).
Coulter (*Pinus coulteri*).
Digger (*Pinus sabiniana*).
Foxtail (*Pinus balfouriana*).
Jeffrey (*Pinus jeffreyi*).
Knob-cone (*Pinus attenuata*).
Limber (*Pinus flexilis*).
Lodgepole (*Pinus contorta*).
Monterey (*Pinus radiata*).
Parry Piñon (*Pinus parryana*).
Singleleaf Piñon (*Pinus monophylla*).
Sugar (*Pinus lambertiana*).
Torrey (*Pinus torreyana*).
Western white (*Pinus monticola*).
Western yellow (*Pinus ponderosa*).
Whitebark (*Pinus albicaulis*).
Poplar: Aspen (*Populus tremuloides*).
Black cottonwood (*Populus trichocarpa*).
Cottonwood (*Populus fremontii*).
Redwood (*Sequoia sempervirens*).
Sequoia (see Bigtree and Redwood).
Sycamore, California (*Platanus racemosa*).
Spruce: Bigcone (*Pseudotsuga macrocarpa*).
Engelmann (*Picea engelmannii*).
Sitka (*Picea sitchensis*).
Weeping (*Picea breweriana*).
Walnut: California (*Juglans californica*).
Willow: Black (*Salix nigra*).
Mountain or Nuttall's (*Salix scouleriana*).
White (*Salix lasiolepis*).

SIX RULES FOR PREVENTING FIRE IN THE FORESTS

1. *Matches.*—Be sure your match is out. Break it in two before you throw it away.

2. *Tobacco.*—Be sure that pipe ashes and cigar or cigarette stubs are dead before throwing them away. Never throw them into brush, leaves, or needles.

3. *Making camp.*—Before building a fire scrape away all inflammable material from a spot 5 feet in diameter. Dig a hole in the center and in it build your camp fire. Keep your fire small. Never build it against trees or logs or near brush.

4. *Breaking camp.*—Never break camp until your fire is out—dead out.

5. *Brush burning.*—Never burn brush or slash in windy weather or while there is the slightest danger that the fire will get away.

6. *How to put out a camp fire.*—Stir the coals while soaking them with water. Turn small sticks and drench both sides. Wet the ground around the fire. If you can't get water stir in dirt and tread it down until packed tight over and around the fire. Be sure the last spark is dead.

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